

## Abstract

A spread spectrum waveform generator has a photonic oscillator and an optical heterodyne synthesizer. The photonic oscillator is a multi-tone optical comb generator for generating a series of RF comb lines on an optical carrier. The optical heterodyne synthesizer includes first and second phase-locked lasers, where the first laser feeds the multi-tone optical comb generator and the second laser is a single tone laser whose output light provides a frequency translation reference. At least one photodetector is provided for heterodyning the frequency translation reference with the optical output of the photonic oscillator to generate a spread spectrum waveform. A receiver pre-processor may be provided to operate on the spread spectrum waveform.